

LISTING OF CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

Claim 1 (Currently Amended): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation, comprising:

keeping the semiconductor wafer substantially dry;

positioning an outlet end of at least one liquid delivery source relative to a surface of the semiconductor wafer so that the outlet end overlies an edge of the semiconductor wafer;

wetting the surface of the semiconductor wafer by using a non-splash rinse technique through the outlet end of at least one liquid delivery source, the non-splash rinse technique being configured to quickly and evenly saturate the surface of the semiconductor wafer; and

scrubbing the surface of the semiconductor wafer with a cleaning brush that applies a chemical solution to the surface of the wafer.

Claims 2-3 (Canceled).

Claim 4 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 1, wherein the cleaning brush is a first cleaning brush and the wetting and the scrubbing are performed in a brush box, the brush box having the first cleaning brush and a second cleaning brush, and the second cleaning brush being implemented to scrub a bottom surface of the wafer.

Claim 5 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 1, wherein the cleaning brush is a first cleaning brush, the wetting is performed in a first brush box and the scrubbing is performed in a second brush box, the second brush box having the first cleaning brush and a second cleaning brush, and the second cleaning brush being implemented to scrub a bottom surface of the wafer.

Claim 6 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 1, wherein the wetting of the surface of the semiconductor wafer comprises:

setting a first delivery source and a second delivery source over the surface of the wafer in order to wet the surface of the wafer at a flow rate of water; and

setting the flow rate to be between about 50 ml/minute and about 300 ml/minute.

Claim 7 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 6, wherein the wetting of the surface of the semiconductor wafer further comprises:

setting a time of less than about 4 seconds to wet substantially all of a top surface of the semiconductor wafer.

Claim 8 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 1, wherein the wetting of the surface of the semiconductor wafer comprises:

rotating the semiconductor wafer about a radial axis at a rate of between about 2 revolutions per minute and about 20 revolutions per minute.

Claim 9 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 1, wherein the semiconductor wafer is disposed completely inside a brush box, and no wafer other than the semiconductor wafer that is inside the brush box is exposed to liquid by the wetting.

Claim 10 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 1, wherein the wetting occurs inside a brush box that does not have an entrance spray.

Claim 11 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 1, wherein the wetting operation occurs inside a brush box, and a spin, rinse, and dry (SRD) operation is not performed on the semiconductor wafer after the plasma etching operation and before the wetting.

Claims 12-20 (Canceled).

Claim 21 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation, comprising:

wetting the surface of the semiconductor wafer by using a non-splash wetting technique, the non-splash wetting technique including setting an outlet end of at least one delivery source over the surface of the semiconductor wafer at an angle in a range from about 5 degrees to about 35 degrees relative to the surface of the wafer, and applying liquid to the surface of the semiconductor wafer through the outlet end of the at least one delivery source; and

scrubbing the surface of the semiconductor wafer with a cleaning brush that applies a chemical solution to the surface of the wafer.

Claim 22 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 21, wherein the non-splash wetting technique further includes:

setting the outlet end of the at least one delivery source to overlie an edge of the semiconductor wafer by a distance in a range from about 2 mm to about 30 mm.

Claim 23 (Previously Presented): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 21, wherein deionized water is applied to the surface of the semiconductor wafer through the outlet end of the delivery source at a flow rate between about 50 ml/minute and about 300 ml/minute.

Claim 24 (Original): A method of cleaning a surface of a semiconductor wafer following a plasma etching operation as recited in claim 21, wherein the plasma etching operation is a tungsten etch-back (WEB) operation.

Claim 25 (Previously Presented): A method for cleaning a surface of a semiconductor wafer, comprising:

receiving a semiconductor wafer that has been subjected to a plasma etching operation, the semiconductor wafer being substantially dry;

positioning an outlet end of at least one liquid delivery source relative to a surface of the semiconductor wafer so that the outlet end overlies an edge of the semiconductor wafer by a distance in a range from about 2 mm to about 30 mm, the outlet end being oriented at an angle in a range from about 5 degrees to about 35 degrees relative to the surface of the semiconductor wafer, and the outlet end being disposed above the surface of the semiconductor wafer by a distance in a range from about 2 mm to about 15 mm;

applying liquid to the surface of the semiconductor wafer through the outlet end of the at least one liquid delivery source; and

scrubbing the surface of the semiconductor wafer with a cleaning brush that applies a chemical solution to the surface of the wafer.

Claim 26 (Previously Presented): The method of cleaning a surface of a semiconductor wafer of claim 25, wherein the liquid is comprised of deionized water.

Claim 27 (Previously Presented): The method of cleaning a surface of a semiconductor wafer of claim 25, wherein the liquid is applied to the surface of the semiconductor wafer through the outlet end of the at least one liquid delivery source at a flow rate between about 50 ml/minute and about 300 ml/minute.

Claim 28 (Previously Presented): The method of cleaning a surface of a semiconductor wafer of claim 25, wherein the liquid is applied to the surface of the semiconductor wafer as the semiconductor wafer rotates about a radial axis at a rate of about 2 revolutions per minute to about 20 revolutions per minute.

Claim 29 (Previously Presented): The method of cleaning a surface of a semiconductor wafer of claim 25, wherein the outlet end of the at least one liquid delivery source overlies the edge of the semiconductor wafer by a distance of about 5 mm.

Claim 30 (Previously Presented): The method of cleaning a surface of a semiconductor wafer of claim 25, wherein the outlet end of the at least one liquid delivery source is oriented at an angle of about 15 degrees relative to the surface of the semiconductor wafer.

Claim 31 (Previously Presented): The method of cleaning a surface of a semiconductor wafer of claim 25, wherein the outlet end of the at least one liquid delivery source is disposed about 7 mm above the surface of the semiconductor wafer.